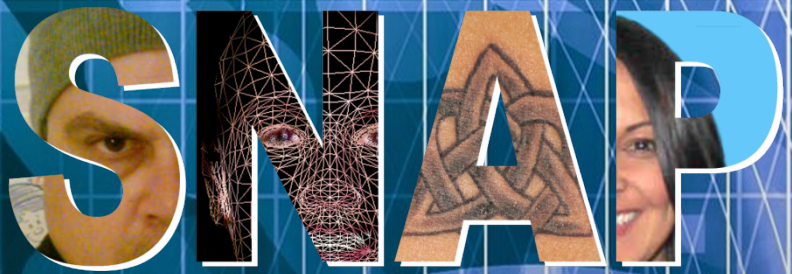


Statewide Network of Agency Photos

Michigan State Police

SEARCH Symposium

July 24, 2019

Facial Recognition Research: Measuring Efficiency, Effectiveness, and Business and Public Safety Value

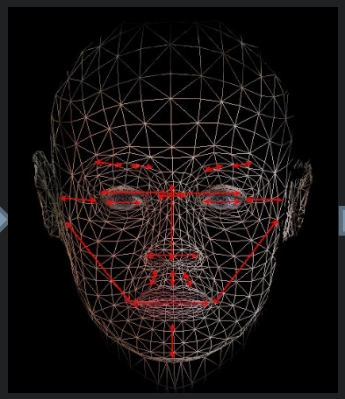
What is Facial Recognition?

Facial Recognition (FR) is the automated searching of a facial image in a biometric database, typically resulting in a group of facial images ranked by computer-evaluated similarity.

Facial Identification (FI) is the manual examination of the differences and similarities between two facial images or a live subject and a facial image (one to one) for the purpose of determining if they represent the same person.

An algorithm takes measurements of the face to create a template. It is this template that is searched against all of the other templates within the SNAP database.

Probe Image



Facial Template

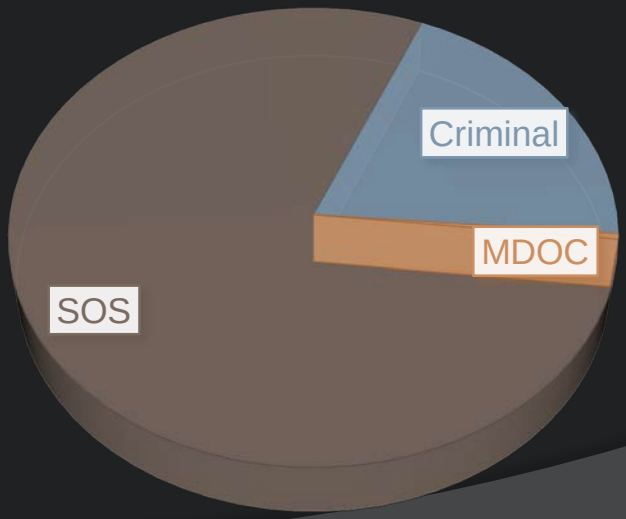
Viable Candidate

What is the Statewide Network of Agency Photos (SNAP)?

- MSP's statewide central repository of photos
  - MDOS database copy, mug shots from agencies around the state, and MDOC photos
- Mug shot photos are submitted via Live Scan by participating agencies at the time of arrest
- July 2019- all but 6 counties across the state are contributing images to the central repository

SNAP Database- July 2019

- >10 million criminal images (Front and Side View, SMT)
  - Approx. 5 million templated front facing images
- >281 thousand templated MDOC images
- >45 million templated MDOS images



SNAP Unit Services

Michigan State Police SNAP Unit

Image Enhancement: 3D Pose Correction

Image Enhancement: Accessory Removal

Investigative Lead Report

Watchlist Hit

DHS HSIN Multi-State FR Program

Photo Lineup: Background Edit

Mobile FR Hit

To request MSP SNAP Unit Services, please email: MSPSNAP@michigan.gov

SNAP Unit- Staff and Training

- Staff
  - 2 trained digital image examiners and 1 trained supervisor (adding a third examiner)
  - Work in conjunction with the Audio Video Analysis Section
- Training: minimum 80 hours of facial comparison and identification
  - Federal
  - Private
  - In-house
  - Proficiency/Continuing Education
- Examiners
  - Study the effects of aging, cosmetic surgery, and weight gain
  - Utilize 3D pose correction software to enhance images
  - Conduct FR searches and morphological comparisons
  - Provide Investigative Lead Reports to law enforcement
  - Testify in court
  - Peer and supervisory review
  - Follow the ACE-V *(Analysis, Comparison, Evaluation, Verification)* Method when completing morphological comparisons

Facial Recognition Past & Present

- Law Enforcement has always used some form of FR (less accurate, less efficient)
  - Wanted Posters
  - Mug Books
  - News (Crime Stoppers)/Public Assistance

- Current use of FR by law enforcement (more accurate, more efficient)
  - Automated FR Searches
    - Investigative searches
    - Field identification (mobile devices)
    - Identity fraud detection

Michigan's Approach

- Policies, procedures, audits, peer reviews, MOUs
- Training (Face Comparison and Identification, Expert Witness Testimony)
- Follow national standards: OSAC, FISWG, FBI/CJIS Admin Rules
- No real-time screening
- FR searches occur AFTER a crime has been committed (crime type & complaint number required)
- FR also utilized to detect identity fraud and to help identify unknown deceased or incapacitated persons (victims)
- Facial examiners role is similar to that of a latent fingerprint examiner and we provide investigative leads only.

Fraud Detection: Image Analysis Team (IAT)

- Process to reduce the number of fraudulent I.D. cards
- In conjunction with MDOS/DMV
- Michigan is ranked in the top 10 states for highest identity theft/fraud

Efficiency and Effectiveness

- How we attempt to measure our effectiveness? Number of Leads produced and our turn around time
- Effectiveness of the technology- algorithms improving in speed and accuracy (NIST FRVT)
- Training impacts efficiency – improving quality of images searched and overall understanding of the process/technology
- Difficult to measure the effectiveness for law enforcement (did an arrest take place)

FR Misconceptions

- False Positives- accuracy based on statistics and likelihoods, not on false positives and negatives. A gallery return isn't measurable in terms of accuracy and error. Unless the computer software returns only 1 image, there are no false positives (vendor testing versus practitioner use)

- Use Cases- The MSP does not currently have the ability to perform FR resulting from a live video feed

- CSI Effect- The MSP does not have the ability to take a poor-quality image and clarify it like it is depicted on popular television shows such as CSI (We cannot introduce data/detail that is not actually present)

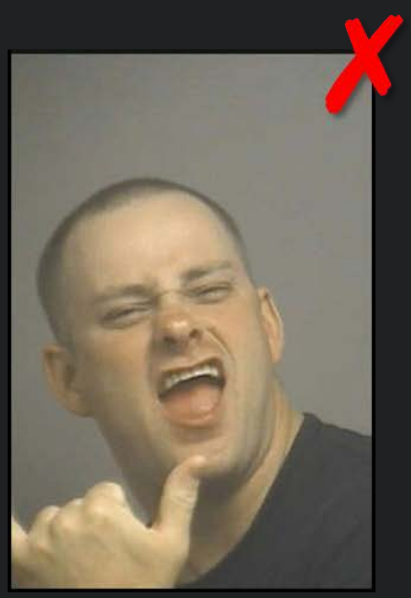
FR Limitations

- Important factors that can positively or negatively impact the outcome of the FR search include; image collection, image capture, subject pose, facial expression, and obstructions

- Automated FR relies on a computer-generated candidate list which may not recognize details humans can perceive, leading to images of the same person scoring weakly or different people scoring strongly. A human is therefore necessary to make the comparison (Black Box Study)

Best Practices- Mug Shots

- Distance
- Glasses
- Accessories



- Background
- Resolution
- Lighting

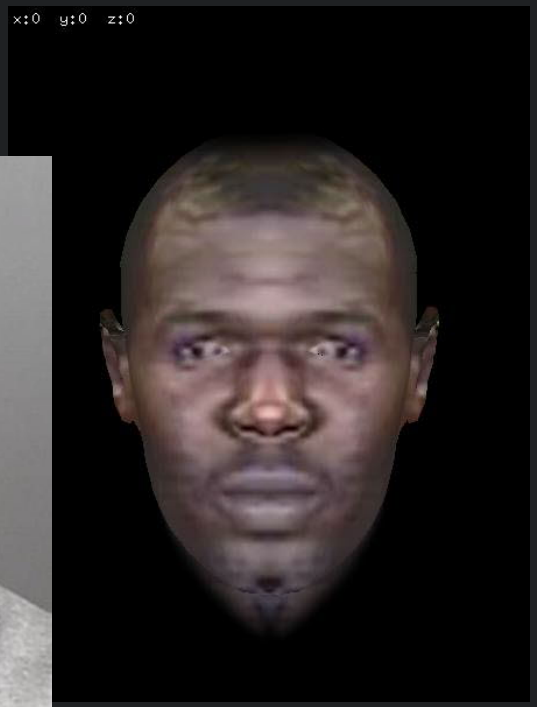
- Expressions
- Garbage in, garbage out

Legislation – Facial Recognition

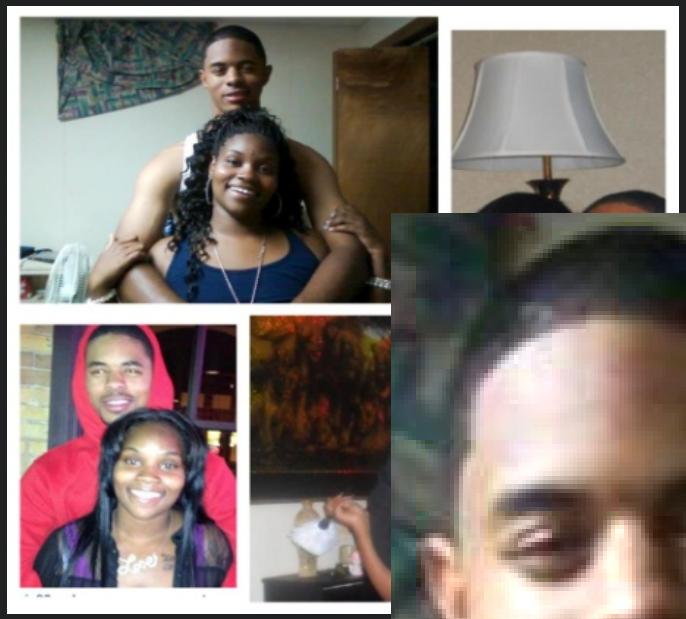
- Senate Bill 342 and House Bill 4810
  - Currently being introduced and debated
- We need legislation/regulations that govern our use of FR technology
- Banning the use of FR
  - Could cause crime rates to go up
  - Could ultimately cause the taxpayers more money as cases may not be solved in a timely Fashion
  - Cases may not be closed in an expeditious manner

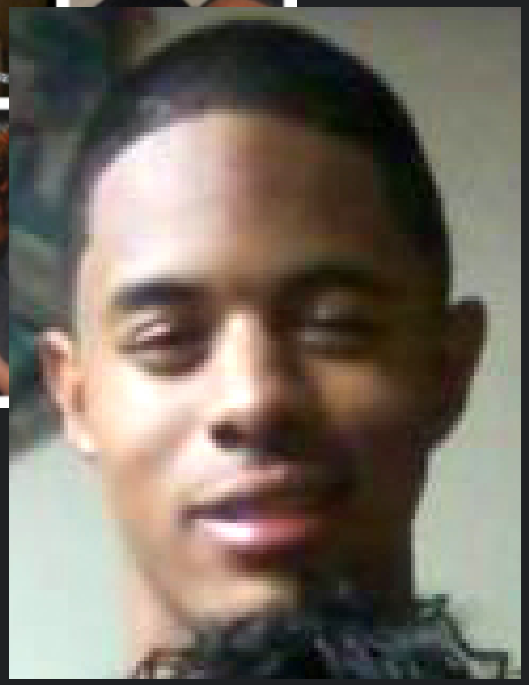
Facial Recognition Successes

Fraud
Probe Image: AVAU still from CCTV (3D Pose Correction)



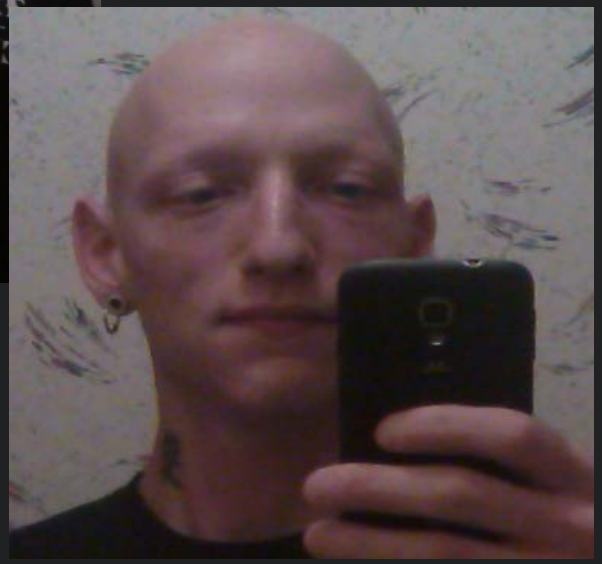
Homicide
Probe Image: Social Media





Child Predator

Probe Image: “Selfie” (Mirroring)



MICHIGAN STATE POLICE

INVESTIGATIVE LEAD REPORT

LAW ENFORCEMENT SENSITIVE

THIS DOCUMENT IS NOT A POSITIVE IDENTIFICATION. IT IS AN INVESTIGATIVE LEAD ONLY AND IS NOT PROBABLE CAUSE TO ARREST. FURTHER INVESTIGATION IS NEEDED TO DEVELOP PROBABLE CAUSE TO ARREST.

BID DIA Identifier: BID-1234-19	Requester: Test
Date Searched: 07/17/2019	Requesting Agency: Test
Digital Image Examiner: Krystal Howard	Case Number: 19-1234 File Class/Crime Type: 0900

Probe Image	Investigative Lead

Name: Jane Doe

Alias:

Date of Birth: 01/01/1970

SID #: 123456T

FBI/UCN #:

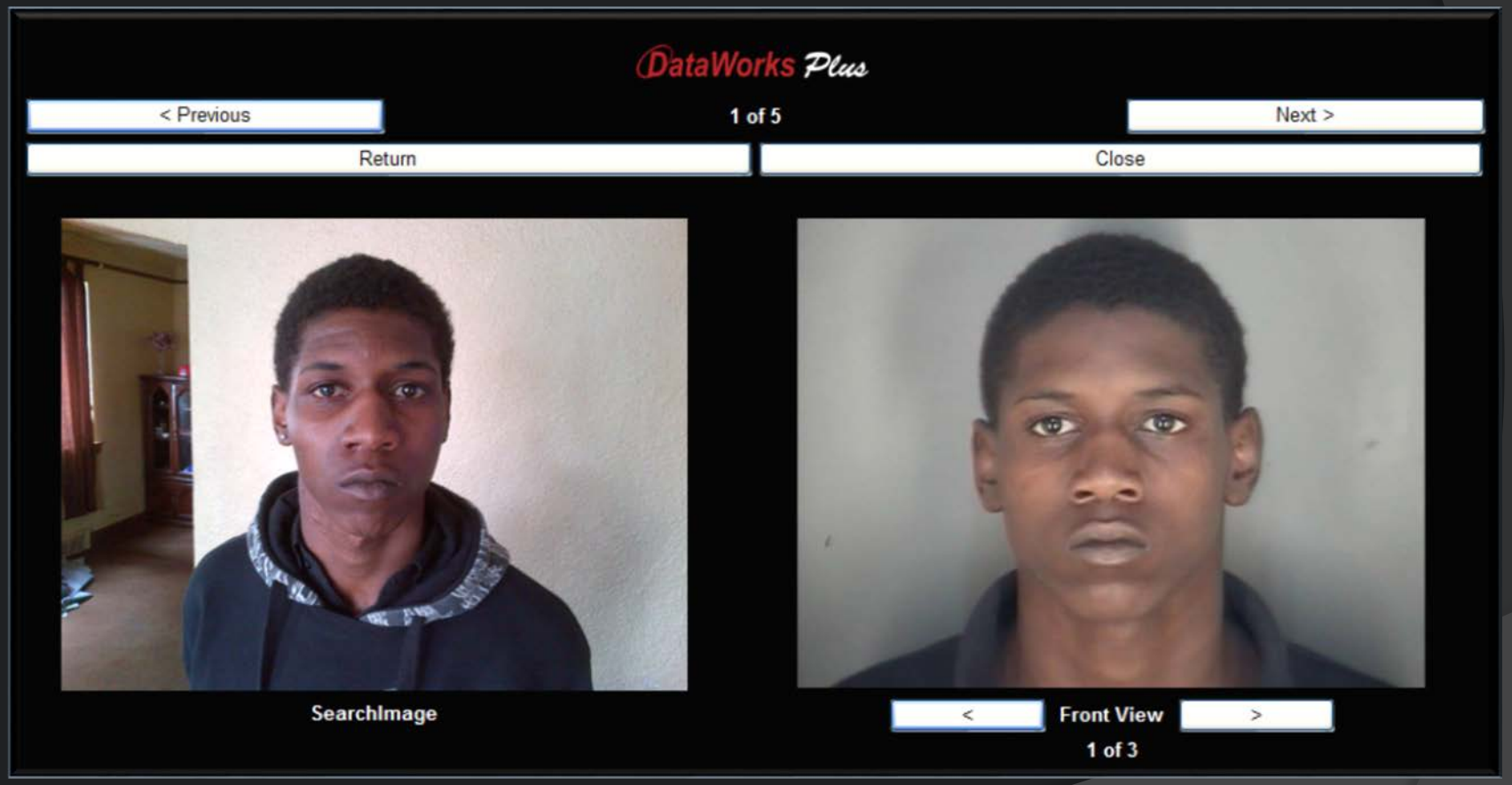
DL/PID:

*This document is the property of the Digital Image Analysis Section (DIAS) - SNAP Unit and is prepared for the limited purpose of information sharing. This information is designated **U//LES and is shared in confidence**. This document contains Personally Identifiable Information (PII) and must be handled in accordance with the SNAP Acceptable Use Policy and FBI CJIS Security Policy. It shall not be shared outside your agency or organization and may not be posted within public view. This document must not be reclassified in any way, in whole or in part. Questions pertaining to this document can be directed to MSPSNAP@Michigan.gov.*

Mobile FR: What is it and how does it work?

- In person capture only from a mobile device
- Officer Safety
- Purpose codes – must select a reason for the search (consent, probably cause, warrant, death)
- Audited – random and targeted
- MOU-agreement must be on file
- Training is required for all users

Mobile Facial Recognition SUCCESS



Mobile Facial Recognition

Future Considerations

- Iris recognition
- Pattern recognition- Tattoos
- Anti-spoofing-Liveness Detection/Authentication
- Real-time

QUESTIONS?

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Request our services at:
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AVAS: MSP-AVAU@michigan.gov